

A PROJECT OPROFILE (NEW)

PRODUCT : **Hard chromium Plating**

PRODUCT CODE : 344021009

QUALITY STANDARD : Electroplated coating of hard chromium on iron and steel (Second revision. IS 1337:1980.

PRODUCTION CAPACITY :

QUANTITY (P.A.) : 12600 Sq.ft.
(Total area hard Chromium plated)

VALUE (Rs.) : 80.64 Lakh

MONTH AND YEAR OF PREPARATION : Feb. 20011

PREPARED BY : **Metal Finishing Division**
MSME-DI
34, Industrial Estate, Nunhai
AGRA- 282006
Ph: 2280879, Fax (0562) 2280882

Introduction:-

Hard chromium plating finds extensive application in the engineering industry due to the extreme hardness of the coating, its resistance to heat, wear, corrosion, erosion or friction. The extreme hardness, excellent wear resistance and low co-efficient of friction of chromium deposits are used to advantage on cutting tools, gauges, dies, moulds piston rods, rollers, textile machinery parts, etc. and in many other industrial applications. Hard chromium deposits are also used for the building up of undersized and worn parts.

Although the equipment and general principles are similar for decorative and hard chromium deposition is some what different from that involved in decorative plating and the thickness and hardness of the coating applied is considerably greater. Hard chromium deposits are generally applied directly to the base metal except in applications like building up badly worn-out or undersized parts and where highly corrosive conditions in service are involved. In such applications, an undercoating is nickel is given and for reclamation work, heavy thickness or nickel is often applied and after machining the article is finished with a thin coating of hard chromium. The nickel layer provides substantial corrosion protection to the base metal, however, the chromium deposits should be at least 13 microns (0.0005 in) thick for providing requisite wear resistance. A thickness of 0.3 to 0.4 mm. (0.012 to 0.015 in) or chromium deposits is generally the maximum applied for any purpose, deposits in excess of this are apt to be brittle.

Market Potential:-

The value of production in electroplating industries in the MSE sector in the country is 100 crore per annum contributing 0.12% of total production SI sector. It would be rather difficult to accurately estimate the overall market size for hard chromium process in the absence of data base, however, it can be stated that this industrial process on account of its extensive application in engineering industries has an excellent scope at places of concentration of such industries. Units with modern facilities for hard chromium plating on job basis can be set up to meet the requirement of industries with stringent quality standards of engineering applications..

Hence, there is wide scope for selling up the products of new unit in this line of manufacturer to meet the requirement.

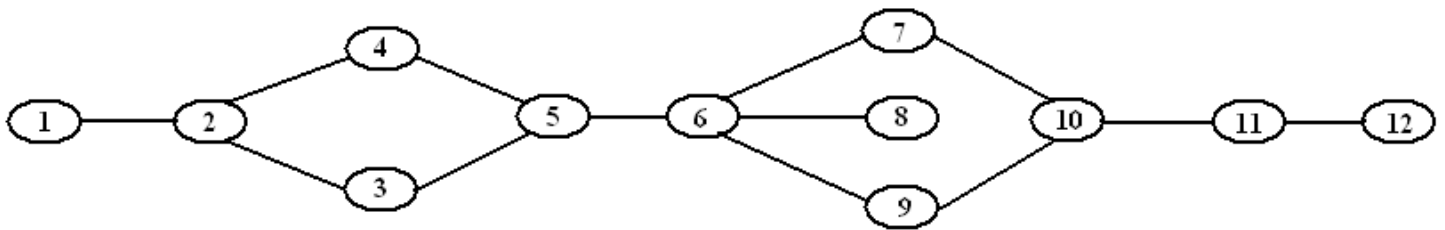
III. Basis & Presumption:-

1. The project Profile has been prepared on the basis of Single of 8-hrs, a day and 25-working days in a month at 75% efficiency.
2. It is presumed that 1st year, the capacity utilization will be 70% followed by 85% in the next year and 100% in the subsequent year.
3. The rates quoted in respect of salaries and wages for skilled worker and others are on the basis of minimum rates in the State.
4. Interest rate for the fixed and working capital has been taken @ 12% on an average whether financed by the Banks or Financial Institutions.
5. The margin money required is minimum (30% of the total capital investment).
6. The rental value for the accommodation of office, workshop and covered area has been taken @60/- per sq. mtr.if applicable.
7. The rate quoted in respect of machinery, equipment and raw materials are those prevailing at the time of preparation of the Project Profile and are likely to vary from place to place and suppliers to suppliers. When a tailor made project profile is prepared, necessary changes to be made.
8. The pay back period may be 5-years after the initial gestation period.
9. The gestation period implementation of the project may be to the tune of 6 to 9 months which includes making all arrangement, completion of all formalities, market surveys and tie-ups etc. Once all the above arrangements are made and quality/standards achieved the 100% project.

10. capacity may be achieved at the end of three years. However, a detailed PERT/CPM/chart with implementation period has been given in the report.

IV. Implementation Schedule:-

The implementation of the project includes various jobs/exercise such as procurement of technical know how, transfer of technology, market surveys and tie-ups, preparation of project report, selection of site, registration, financing of project, procurement of machinery and raw materials etc. recruitment of staff, erection/commissioning of machines, trial production and commercial production etc. In order to efficiently and successfully implement the shortest period the slack period is curtailed to minimum possible and as far as possible simultaneous exercise are carried out. In view of above a CPM-PERT chart has been illustrated below, According to which a minimum period of 227 days is involved in finally starting the project on commercial basis. By following this process a time period of 82 days can be saved.



Details of Activities

C.P.M

Activity	Days	Activity	Days	Particulars of activity
1-2	15	1-2	15	Procurement of Tech. know how/ Transfer of technology.
3-4	15	3-4	15	Market survey, tie up and obtaining quotations.
4-5	7	2-3	7	Selection of site.
5-6	70	4-5	7	Preparation of Project
6-7	45	5-6	70	Registration and financing.
7-10	30	6-7	45	Place of orders for machinery and receipt of machines.
10-11	30	6-8	30	Recruitment of staff and training
11-12	15	6-9	30	Addition/Alteration in rental premises
		8-10	15	Procurement of raw material/bought out components
		7-10	30	Erection, Electrification and Commissioning
		10-11	30	Trial Production
		11-12	15	Commercial Production
227 days		309 days		

V. Technical Aspect

Manufacturing Process:-

The steel part to be hard chromed are pre-cleaned in a suitable hot alkaline soak cleaner and rinsed well. To obtain a good adhesion of the deposits, anodic etching in simple chromic sulphuric bath for 1-2 minutes is carried out in a separate tank normally. After the etching, the parts are transferred to plating bath. After plating. The parts are immersed in drag-out tank rinsed following by the another water rinsed and hot water rinsed. In case of hardened steel, components are heated to 200 deg.c or above to eliminate hydrogen embitterment.

Sequence of Operation:- The following sequence of operative is usually followed for hard chrome process-

1. Buff & degrease,
2. Soak clean
3. Electro clean (anodic)
4. water swill
5. Anodic etching in chromic acid solution of 200 Gm/Lit. with 2 gm./ 1 of sulphuric acid for 1-2 minutes at CD of 185-275 a/Sq. ft.
6. water Swill
7. Hard chrome plating
8. drag out
9. water swill
10. hot water swill
11. dry.

Bath make-up

	Optimum	Range
Hard chrome		
Salt	250g/1	200-300g/1

Operation conditions

Density	19deg.Be	18-22deg. Be
Temp.	55 C	52-65 C
Cathode C.D	25A/Dm sq.	20-60/dm
Voltage	6 volts	6-15 volts
Anodes	7% antimony lead anode round, flat or corrugated	

Maintenance

Chromic acid	200-250 g/1
Sulphate	1-2.5 g/1

Quality Specifications:- Electroplated coatings of hard chromium on iron and steel(2nd revision) IS 1337:1980.

Code of practice for hard chromium plating on iron and steel for general engineering purpose(1st revision) Is 1986:1981.

Production Capacity (Per Annum)

In planting tanks of sizes 7x3x3 ft. as envisaged in the project profile total area of 3.5 sq. ft. and 2.5 sq. ft. can be hard chromed respectively. A thickness of 25 microns can be achieved in 90 minutes at a C.D of 30 A/dm². In 12 working hours with a margin of 1½ hours for electrolyte pre heating, maintenance, loading/unloading and handling. 7 lots can be taken out. Assuming 300 working days in a year, production is worked out as under.

- A) quantity 12600 sq. ft. (total area hard chrome plated)
- B) Value Rs. 80,64,000/=

Pollution Control Needs/ Requirements

For the treatment of chromic acid and chromate containing rinsed water, the normal procedure is reduction of the chromium to the trivalent state, followed by its precipitation as hydroxide sodium carbonate or calcium hydroxide. Sodium bisulphate in an acid solution is commonly used for this purpose, the active reducing compound being sulphuric acid. Theoretically, 3 kg. of sodium bisulphate (60-62% SO₂) plus 2 to 3 kg. of sulphuric acid is required to reduce 1 kg. of hexavalent chromium. The reaction takes place at an optimum pH of 2.5 instantaneously. Since only chromium hydroxide is precipitated sludge volume is kept to the minimum. The treatment has to be carried out in the right way, in a properly designed treatment plant. The resultant effluent will contain little residual hexavalent chromium. Sodium bisulphate is used in smaller treatment plant and sulphur dioxide in larger treatment plant.

To minimize the air pollution, ducts along the sides of chromium plating tank are provided which are led into a condensing chamber and then to the fan outlet which is taken out at least 6 ft. (1.8m) above roof level. Glass fibre laminated and PVC sheets are used for the fabrication of exhaust equipment. The ducts may be made of PVC and then laminated with glass fibre to give additional mechanical strength. Demisters with arrangement of canes or baffles which separated liquid/spray from the stream are also used on fume extraction discharge from chromium plating plant permitting the recovered solution to be returned to the process tank.

1. Energy Conservation:-

The lagging of the exteriors of heated tanks will result in considerable heat conservation. Panels of insulation material e.g. plastic foam sheet with an outer layer of glass fibre plastic laminated are fitted to the sides of the tank for this purpose, losses of heat from electrolyte surface can be reduced, considerably by covering the solution with layers of polypropylene chroffles. A single layer of chroffles will reduce the heat losses by an approximate 60-75%.

VI Financial Aspects:-

1. Fixed Capital:-

Land 250 sq. meter @Rs. 1000/- per sq. meter	2,50,000/-
Covered Area 100 Sq. Mtrs. @Rs. 7000/- sq. meter	<u>7,00,000/-</u>

Total Rs. 9,50,000/-.

2. Machinery and equipment:-

S.No.	Description	Ind/Imp	Qty	Value(rs)
(a) <u>Production unit</u>				
<u>Name of machine with specification</u>				
(i)	Oil cooled silicon rectifier with stepless Control, output current rating 1000A,output voltage 12V complete with mater panel etc.	Ind	1No.	2,00,000
(ii)	Do- Output current rating 750A,max output Voltage 12V	Ind	1No.	1,50,000
(iii)	Resistant board 500A-12V.	Ind.	2 No.	30,000
(iv)	Hard chromium planting tank 3 mm M.s/3mm L.L 7x3x3 ft. with ducts and bowler for fume extraction Thermostatic control equipment	Ind.	1 No.	1,00,000
(v)	-Do-5x3x3 ft.:	Ind.	1 No.	1,00,000
(vi)	Etching tank 3mm ms/3 mm L.L 6x3 ft. with Lip duct and bowler arrangement.	Ind.	1 No.	1,00,000
(vii)	Anodic cleaning tank 3mm ms/6x2x3 fts	Ind.	1 No.	30,000
(viii)	Dragout tank 3 mm ms/3mm L.L 6x2x3 fts	Ind.	1 No.	70,000
(ix)	Water swill tank 3mm ms/5mm R.L. 5x2x3 ft	Ind.	1 No.	70,000
(x)	Immersion heaters 3 KW Lead bonding ms	Ind.	8 No.	40,000
(xi)	Polypropylene tubs for swilling 200 ltrs.	Ind.	5 No.	10,000
(xii)	Polishing Machine 3 HP	Ind.	2 No.	20,000
(xiii)	Bus bar connection	Ind.	L.S	20,000
(xiv)	Chain pulley block	Ind.	1 No.	10,000
(b)	Testing equipments like reagents, glassware for laboratory Analysis of solution, hull pell test, apparatus with 3 phase rectifier Capable of giving 10 volts, panel, BNF, jet apparatus, CASS Test appararus, Etc.	Ind.	L.S	2,00,000
(c)	Pollution control equipment	Ind.	1 No.	2,00,000
(d)	electrification & installation charges @ 10% of cost of Machine and equipments	Ind.	1 No.	1,35,000
(e)	Cost of jigs & fixture and insulation etc.	Ind.	1 No.	65,000
(f)	Cost of the office equipment/working table	Ind.	1 No.	2,00,000

Total Cost of Machinery & Equipments

17,50,000

(3) Initial makeup Raw material for bath:-

S.NO.	Description	Ind/Imp.	Qty.Kgs	Rate	Value(Rs.)
1.	Hard chrom salt	Ind.	800	200	1,60,000
2.	Chromic Acid	Ind.	300	150	45,000
3.	Anodic Cleaner	Ind.	80	100	8,000
4.	Misc. Chemicals viz., soak cleaner, Catalyst, barium carbonate/hydroxide Sulphuric acid, hydrochloric acid, CP, Inhibitors, polishing material etc.	Ind.	L.S	-	50,000
5.	7% antimonial lead anodes	Ind.	42	500	21,000
Total					<u>2,84,000</u>

(4) Pre operative expenses(project cost, nom refundable deposits)

Total fixed capital (1+2+3+4)

Rs. 66,000
30,50,000

VII. Working Capital (Per Month)

Staff and Labour (Per month):-

(1) Personal

S.NO.	Description	No.	Salary@	Total value (Rs.)
1.	Manager	1	10,000	10,000
2.	Supervisor/Foreman	1	8000	8,000
3.	Inspector (Q.C.)	1	6000	6,000
4.	Accountant	1	5000	5,000
5.	Skilled worker	4	5000	20,000
6.	Labour/ Helper/Peon	4	4000	16,000
				<u>6,5000</u>
Perquisites @ 15%				<u>9,750</u>
Total				<u>74,750</u>
Say				<u>Rs. 75,000</u>

(2) Raw Material (pert month):-

S.No.	Description	Ind/Imp.	Qty.	Rate	Value(Rs.)
1.	Hard chrom salt	Ind.	850	200	1,70,000
2.	Chromic Acid	Ind.	225	150	33,750
3.	Anodic Cleaner	Ind.	480	100	48,000
4.	Misc Chemicals viz., soak cleaner, Catalyst, barium carbonate/hydroxide, Sulphuric acid, hydrochloric acid, CP, Inhibitors, polishing materials etc.	Ind.	L.S	-	<u>48,250</u>

Total	Rs.	3,00,000
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(3) Utilities (per month):-

Electricity	11500 KWH @ Rs. 6/-unit	69,000/-.
Water		<u>1000/-.</u>

Total	Rs.	70,000/-
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(4) Other Expenditure (per month)

1. Postage & Stationary	2000
2. Advertisement	3000
3. Repair & Maintenance	3000
4. Telephone	5000
5. Transportation	10000
6. Consumable	3000
7. Sales expenses	3000
8. Insurance	2000
9. Misc. Expenses	<u>4000</u>

Total	Rs.	35,000
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VII. Total recurring Expenditure (per month):-

(75000+300000+70000+35000)	4,80,000
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IX Working capital on three months basis:-

4,80,000 x 3	14,40,000
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X. Total Capital Investment:-

Fixed capital:	30,50,000
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Working capital for 3 months:	<u>4,80,000</u>
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Total	<u>35,30,000</u>
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XI. MACHINERY UTILIZATION:-

To achieve the full capacity, all process involved in the manufacturing of item should be followed in proper way. There is no particular bottle neck operation for manufacturing for this product.

XII. Additional Information if any;

XIII. FINANCIAL ANALYSIS

1. Cost of Production (per annum)

a. Total recurring cost per year	57,60,000
b. Depreciation on Machinery & Equipment @ 10%	1,75,000
c. Depreciation on fur nature @ 20%	40,000

d. Interest on total Capital Investment @ 12%	4,23,600
e. Depreciation on Building @ 5 % if any	<u>35,000</u>
Total:	64,33,600
Say	64,34,000

XIV Turn Over per Annum:-

S. NO.	Description	Qty.	Rate	Value
(i)	Hard hromium plating on machine Parts, dies, moulds, cutting tools etc. On job basis.	12600sq.ft	640persq.ft.	80,64,000/-

XV. Net profit per annum before income tax

T.O. - CP = Profit

$$80,64,000 - 64,34,000 = 16,30,000$$

XVI. Net profit ratio:-

$$\frac{\text{Net profit} \times 100}{\text{Turn Over}} = \frac{16,30,000 \times 100}{80,64,000} = 20.2\%$$

XVII. Rate of Return :-

$$\frac{\text{Net profit} \times 100}{\text{Total investment}} = \frac{16,30,000 \times 100}{35,30,000} = 46\%$$

XVIII. BREAK EVEN ANALYSIS:-**(1) Fixed Cost (per annum)**

a. Total Depreciation (on m/c. & equipment dies, tools, furniture)	2,15,000
b. Interest on borrowing (total Investment)	4,23,600
c. 40% of salary	3,60,000
d. 40% of other contingent expenses	1,58,400
e. Insurance	24,000
f. Dep. On building ` (excluding rent & insurance)	<u>35,000</u>
Total: (F.C.)	12,16,000

X IX. Break Even Point

$$\text{B.E.P. (\%)} = \frac{\text{Fixed cost} \times 100}{\text{Fixed cost} + \text{profit}}$$

$$= \frac{1216000 \times 100}{1216000 + 1630000}$$

$$= \frac{1216000 \times 100}{2846000} = 42.7\%$$

XXL. LIST OF MACHINERY AND EQUIPMENT SUPPLIES

1. M/s. Jindal Electrical, 390 A Ind. Area, A Ludhiana - 141003
2. M/s. Usha Rectifier Co-op (I) Ltd. 12/1 Mathura Rd. Faridabad
3. M/s. Delta Chemicals P. Ltd. Kamani Chambers, Nicol Road, Ballard Estate Bombay-1
4. M/s. Bright Metal Indls. AK.-13 Arakashan Road, Paharanganj, New Delhi-55
5. M/s. Delta Chemicals P. Ltd. Delta House, J-1 Cama Indls. Jone Goregoan (E) Bombay-63

RAW MATERIAL SUPPLIERS

- (i) M/s. Delta Chemicals P.Ltd Delta House, J-1 Cama Indls. Jone Goregoan (E) Bombay-63
- (ii) M/s. Platewal Processes & Chemicals, Padra Road Atladra, Vadodara-390012
- (iii) M/s. Canning Mitra Phoenic Ltd. Eucharistic Congress Bldg. III,5, Convent street, Bombay-39